

# Claims

- [c1] 1. A method for reducing resist poisoning, comprising the steps of:
- forming a first structure in a dielectric on a substrate;
  - reducing amine related contaminants from the dielectric and the substrate created after the formation of the first structure; and
  - forming a second structure in the dielectric.
- [c2] 2. The method of claim 1, wherein the reducing step includes providing an  $N_2O$  plasma wafer treatment to the dielectric and substrate.
- [c3] 3. The method of claim 2, wherein the  $N_2O$  plasma wafer treatment is performed at approximately 400 degrees Celsius.
- [c4] 4. The method of claim 3, wherein the  $N_2O$  plasma treatment chemically binds, traps or consumes the contaminants such that the contaminants will not diffuse out from either the substrate or the dielectric during the formation of the second structure.
- [c5] 5. The method of claim 2, wherein the reducing step includes a wet etching of approximately 30 seconds at 25

degrees Celsius 100:1 ratio of DHF (dilute hydrofluoric acid).

[c6] 6. The method of claim 5, wherein the reducing step further includes the steps of:

coating the substrate and the dielectric with organic antireflective coating film (ARC);

baking at approximately 100 degrees Celsius to 250 degrees Celsius the ARC to remove amine based contaminants; and

removing the ARC by dry stripping or plasma etching.

[c7] 7. The method of claim 8, wherein the ARC is exposed to UV light.

[c8] 8. The method of claim 1, wherein the reducing step further includes the steps of:

coating the substrate and the dielectric with an organic antireflective coating film (ARC);

baking the ARC at approximately 100 degrees Celsius to 250 degrees Celsius to remove amine based contaminants; and

removing the ARC.

[c9] 9. The method of claim 8, further comprising the step of depositing a plasma enhanced chemical vapor deposition

(PECVD) oxide cap after removal of the ARC.

- [c10] 10. The method of claim 9, wherein the oxide cap is approximately 25 nm.
- [c11] 11. The method of claim 9, wherein prior to the deposition of the oxide cap, an annealing process is performed at about 400 degrees Celsius for about 60 seconds.
- [c12] 12. The method of claim 11, prior to the deposition of the oxide layer, a  $\text{N}_2\text{O}$  or  $\text{O}_2$  plasma etch at an approximate temperature of 400 degrees Celsius is performed.
- [c13] 13. A method for reducing resist poisoning comprising the steps of:
- forming a first structure having in a dielectric on a substrate;
  - forming a first organic film on the substrate;
  - heating the first organic film;
  - removing the first organic film from the substrate;
  - and
  - forming a second organic film on the substrate and patterning the second organic film to define a second structure in the dielectric.
- [c14] 14. The method of claim 13, wherein the first organic film comprises ARC (anti-reflective coating) or photo resist.

- [c15] 15. The method of claim 13, wherein the heating step comprises annealing at a temperature from about 100 to about 250 degrees Celsius.
- [c16] 16. The method of claim 13, wherein the removing step comprises a plasma etch.
- [c17] 17. The method of claim 13, wherein before the forming of the first structure step, performing a 100:1 DHF wet etch of the dielectric.
- [c18] 18. The method of claim 13, wherein after the removing step, depositing a non-amine dielectric having a thickness of about 25 nm.
- [c19] 19. The method of claim 18, wherein the non-amine dielectric comprises oxide.
- [c20] 20. The method of claim 18, wherein before the depositing step, performing an anneal at a temperature of about 400 degrees Celsius for about 60 seconds.
- [c21] 21. The method of claim 18, wherein before the depositing step, performing an  $N_2O$  or  $O_2$  plasma etch at a temperature of about 400 degrees Celsius.
- [c22] 22. The method of claim 13, wherein after the heating step, exposing the first organic film to UV light.

- [c23] 23. The method of claim 13, wherein the first structure comprises one of a via and a trough, and the second structure comprises one of a trough and a via.
- [c24] 24. The method of claim 13, wherein a critical dimension of the first structure is about 200nm and the photolithographic minimum is about 248 nm.
- [c25] 25. A method for reducing resist poisoning comprising the steps of:
- forming a first structure in a dielectric on a substrate;
  - performing a DHF wet etch on the dielectric at a ratio of about 100:1;
  - forming an anti-reflective coating (ARC) on the dielectric and the substrate;
  - removing the ARC; and
  - forming a second organic film on the substrate and patterning the second organic film to define a second structure in the dielectric.
- [c26] 26. The method of claim 25, further comprising the step of forming an oxide cap on the dielectric and the substrate prior to forming the second organic film step.
- [c27] 27. The method of claim 25, wherein the step of forming the ARC includes baking the ARC between approximately 175 degrees Celsius to 220 degrees Celsius and dry step

removal of the ARC to eliminate amine based contaminants.

- [c28] 28. A method for reducing resist poisoning, comprising the steps of:
- forming a first structure in a dielectric on a substrate;
  - wet etching the formed first structure at approximately 3nm 100:1 ratio of DHF (dilute hydrofluoric acid);
  - applying an organic film on the exposed portions of the first structure, the dielectric and the substrate, wherein the applying step includes:
    - spin coating on the organic film on the exposed portions;
    - baking the organic film at approximately 100 degrees Celsius to 250 degrees Celsius; and
    - removing the organic film by dry stripping or plasma etching;
  - capping the exposed portions of the first structure, the dielectric and the substrate; and
  - forming a second organic film on the substrate and patterning the second organic film to define a second structure in the dielectric.

- [c29] 29. The method of claim 28, wherein the baking step is performed between 150 degrees Celsius to 220 degrees

Celsius to remove the amine based contaminants.

- [c30] 30. The method of claim 28, wherein the organic film is an ARC.
- [c31] 31. A structure with reduced resist poisoning, comprising a structure embedded in dielectric with a vertical dielectric adjacent to a vertical sidewall of the structure, the vertical dielectric being deposited after the patterning and etching of a structure into the dielectric.
- [c32] 32. The structure of claim 31, wherein the dielectric includes one of  $\text{SiO}_2$ , F-doped  $\text{SiO}_2$ ,  $\text{CH}_3$ -doped  $\text{SiO}_2$ .
- [c33] 33. The structure of claim 31, wherein the vertical dielectric includes one of group  $\text{SiO}_2$ , P-doped  $\text{SiO}_2$ , F-doped  $\text{SiO}_2$ , B-doped  $\text{SiO}_2$ , and B- and P-doped  $\text{SiO}_2$ .